UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

ACRSR-2178

February 22, 2006

Luis A. Reyes
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

SUBJECT: DRAFT NUREG REPORT, "EVALUATION OF HUMAN RELIABILITY ANALYSIS METHODS AGAINST GOOD PRACTICES"

Dear Mr. Reyes:

During the 529th meeting of the Advisory Committee on Reactor Safeguards, February 9-10, 2006, we met with representatives of the NRC staff to discuss the draft NUREG report, "Evaluation of Human Reliability Analysis Methods Against Good Practices" (Reference 1). Our Subcommittees on Reliability & Probabilistic Risk Assessment and Human Factors also discussed this report with the staff during a joint meeting on December 15-16, 2005. We also had the benefit of the documents referenced.

RECOMMENDATION

The draft NUREG report, "Evaluation of Human Reliability Analysis Methods Against Good Practices," should be issued for public comment.

DISCUSSION

Probabilistic risk assessment (PRA) guidance documents are essential to implementing the Commission's phased approach to PRA quality. The American Society of Mechanical Engineers PRA standard (Reference 2) and Regulatory Guide 1.200 (Reference 3) provide high-level guidance on what items should be addressed in a PRA without specifying methods for implementation. This lack of specific guidance is particularly acute in the area of human reliability analysis (HRA), especially for human actions under accident conditions where several models are being used by various groups. An early benchmark exercise by the European Commission's Joint Research Centre at Ispra showed substantial variability in the results produced by the same group of analysts using different HRA models, as well as substantial variability in the results from the same model used by different teams (Reference 4).

At the present time, there is no documented systematic evaluation of the assumptions, strengths, and weaknesses of the many HRA models. The staff is remedying this situation in two phases. First, a document was prepared to identify a set of good practices (Reference 5). HRA analysts should follow those practices regardless of the particular model used. In the second phase, several HRA methods were reviewed and evaluated against these good practices. These are documented in the draft NUREG report. This review is limited to models used in the United States, although the staff plans to expand its review to include international methods during the next round of evaluations.

The purpose of the draft NUREG report is to aid reviewers of HRAs in evaluating analyses submitted to the NRC. Since the report highlights the strengths, limitations, and bases of various commonly applied HRA models, it should also be useful to analysts preparing HRAs and other submittals requiring considerations of human performance.

The staff and its contractors performed most of the evaluations, but arranged for outside experts to evaluate models developed under NRC sponsorship (ATHEANA, SPAR-H, and SLIM/FLIM) in order to get a more objective assessment. We commend the staff for this action.

The draft NUREG report is an important step toward improving the consistency and quality of the application of HRA. Including the evaluations of several models against a common set of criteria in one document will be very useful to future work on the resolution of the significant model uncertainties that now exist in HRA. The report should be issued for public comment. We plan to review the draft final report after resolution of public comments.

Sincerely,

/RA/

Graham B. Wallis
Chairman

References:

1. Memorandum from Charles E. Ader, Director, Division of Risk Analysis and Applications, Office of Nuclear Regulatory Research, to John T. Larkins, Executive Director, Advisory Committee on Reactor Safeguards, "Transmittal of the Draft Report 'Evaluation of Human Reliability Analysis Methods Against Good Practices'," January 12, 2006.

2. "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002 (including the Addenda to Standard RA-SA-2003), American Society of Mechanical Engineers, April 5, 2002.

3. "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," Regulatory Guide 1.200 For Trial Use, U.S. Nuclear Regulatory Commission, Washington, DC, February 2004.

4. A. Poucet, "The European Benchmark Exercise on Human Reliability Analysis," Proceedings of the American Nuclear Society International Topical Meeting on Probability, Reliability, and Safety Assessment (PSA '89), Pittsburgh, PA, April 2-7, 1989, pp. 103-110.

5. "Good Practices for Implementing Human Reliability Analysis", NUREG-1792, US Nuclear Regulatory Commission, Washington, DC, 2005.

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